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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/628,828	07/31/2000	Luca Rigazio	9432-000116	5141

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EXAMINER	
HAN, QI	
ART UNIT	**PAPER NUMBER**
2654	11

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/628,828	Applicant(s) RIGAZIO ET AL.
	Examiner Qi Han	Art Unit 2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 June 2004 and 29 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *4/29/04 and 7/31/2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Response to Amendment

2. The Applicant(s) amended claims 1 and 10 (see paper 7, pages 3 and5), and filed the RCE examination request (Paper 10) on 06/04/2004.

3. Examiner withdraws the disclosure objection (a), because applicant made amendment and/or correction (see paper 7, page 2).

Response to Arguments

4. Applicant's arguments regarding disclosure objection (b)-(d), (see paper 7, pages 9-10) have been fully considered, but they are not persuasive or partially incorrect, please see detail objections below.

5. By reviewing the specification and the arguments regarding objections (paper 7, page 9-11), examiner believes that claims 1 and 10 have enablement problem, which should be rejected under 35 USC 112 (see detail below).

6. In response to applicant's arguments that "the tree 70 is self-explanatory in that it is a lexical diagram" (paper 7, page 10, section d), examiner should point out again (also see the objection in the previous office action, page 5, issue d.) that the top part of Fig. 4a is not tree at all, because it is well know in the art that a "**tree**", by definition, cannot form any closed circle (loop). Therefore, Fig.4a cannot be self-explanatory for different structures in one traversal algorithm. It is also noted that it is applicant responsibility to make a clear description, and it is for public not for applicant to fully disclose the claimed invention, in a patent application. Therefore using one-to-one correspondence structures would help to reduce unnecessary confusions and help public to better understand the clamed invention. In the instinct application, there is no special reason and/or benefit to use different structures to illustrate one traversal algorithm, and there is no any difficulty to use "one-to-one correspondence" between the sub-diagrams.

7. In response to applicant's arguments regarding amended claims 1 and 10 (see paper 7, page 12, last paragraph to page 13 second paragraph), it is noted that based on the best understanding in view of disclosure objections and claim rejections under 35 USC 112 (see detail below), the combined references is capable of implementing the functionality as the claimed (see detail in the claim rejection under 35 USC 103 in this office action).

Specification and Drawing

8. The disclosure is objected to because of the following (using the same objection symbols as previous office action for convenience):

b. regarding amended Fig. 2 (see paper 7, attachment after last page of the amendment), even though applicant argued that Fig. 2 and Fig. 4b are used for different examples, the Fig. 2 itself should be correct. However, the amended Fig. 2 still shows multiple errors in the drawing, such as unmatched portions between left side and right side, wrong link between 'root" and "h", no explanation for the small black square. Particularly, the unmatched path for "hart" had been pointed out in previous office action, but there is no correction or explanation in the amendment, at all, in the amendment. Appropriate correction on specification and/or drawing is required.

c. on page 14, lines 10-18, regarding the traversal algorithm and Fig.4b, (even though applicant argued and explained using Fig. 4b, see amendment: paper 7, pages 9-10), the algorithm is not clearly defined. For example, it is unclear that whether an active list pre-exist or not; nowhere shows how to determine a rank of node, either in the algorithm steps or in Fig. 4b; and it is unclear what the value of the variable "c" (or "k") stand for in the comparison (a rank of node, a link of node position, an index of node address or some value of the node?) because applicant only says "child node c". It also unclear whether or not variable "n" is referred to the same symbol in line 9 of page 13 and what relationship is between "n" and "c", "k" and/or "B". Even though Fig.4b can illustrate some meaningful traversal steps, it cannot fully show the disclosed algorithm as stated above. Similarly, if following the disclosed algorithm steps, one skilled in the art cannot result in Fig.4b, because the disclosure lacks clear description and/or necessary steps. Appropriate correction is required. Examiner suggests to consider adding rank number on each nodes of the tree in Fig. 4b.

d. regarding Fig. 4a, according to specification, page 17, lines 9-22, the trees having envelop 74 and 76 in Fig. 4a should be same as the disclosed tree on top of Fig.4a for consistence, but they are not, which is not proper. It is pointed out that to illustrate a traversal approach should use consistent structure components and/or sub-diagrams for purpose of easily comparing the different steps and understanding the claimed invention, particularly, when showing the same algorithm with these components or sub-diagrams within one drawing. It is also unclear that whether the reference number 70 is referred to the top part of Fig. 4a (examiner treat it in this way, based on specification, page 17, lines 9-10) or the whole figure (applicant referenced in the amendment). In the case that "70" refers to whole figure, a separate reference number need to be added for the top structure of Fig.4a. In addition, it is noted that the top part of Fig. 4a is not tree at all, because it is well know in the art that a "**tree**", by definition, cannot form any closed circle (loop). Appropriate correction is required. Examiner suggests to consider changing the top part of Fig. 4b as a tree structure.

9. Concerning multiple errors and confusions found in the specification and in the drawings (see above, including amended Fig.2), examiner suggests applicant to check and correct any errors of which applicant may become aware in the application, and to consider to provide new amended drawings for Figs. 2, 4a and 4b (also see attached PTO-948 form).

Claim Objections

10. Claim 1 is objected to under 35 CFR 1.75(e) because the form of the claim does not comply with order specified for the independent claims when the preamble of the

claim sets forth that the claim is directed to an improvement. Note that the dependent claims are also directed to the improvement. The preamble recites “In a dynamic programming system, the improvement comprising: ...”, in which the statuary class of the claim is not clearly defined. Examiner suggests replacing it with “An improvement of a dynamic programming system”.

Claim 10 is objected to for the same reasons as claim 1 because the limitations are recited using obviously similar phrases.

Regarding claim 19 and 20, the Applicant is advised that should claim 19 be found allowable, claim 20 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

In addition, in claim 20, second line, it appears either being a typographical error (duplicate phrase “wherein said”) or missing a phrase after first phrase of "wherein said".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1, 3 and 6 -16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao (US 6,374,222 B1), in view of Mitchell et al. (US 6,574,595), hereinafter referenced as Mitchell.

As per **claim 1**, as best understood in view of objection (see above), Kao discloses a method of memory management in speech recognition, for reducing the size of memory required in speech recognition searching (abstract), comprising:

a tree data structure implemented in a computer-readable memory accessible by a processor, said tree data structure having a plurality of nodes that topologically define a root node and a plurality of parent-child generations, including a deepest child generation that is topologically furthest from the root (column 3, lines 2-5 and Fig. 1, 'computer/comparator 10b' and 'memory10c'; column 6, line 37, 'digital signal processor'; column 2, line 40 and column 8, line 9, 'search tree' and 'node' equivalent to 'slot', also see Fig. 5);

a traversal algorithm implemented by said processor , said algorithm traversing said nodes based on a set of traversal rules, (column 6, lines 37-38, 'Digital Signal Processor implementation'; column 4, lines 1-67 and column 9, lines 10-45, 'a structure called slot (herein equivalent to node)' and 'search algorithm', including the fields of indexes and pointers and the algorithm related requirement, grammar, timing and condition (herein broadly interpreted as a set of traversal rules); and column 5, lines 61-67 and Fig.4, 'traverse down the search space'), "whereby nodes of a given generation are processed before the parent nodes of said given generation are processed" and "traversal among nodes of each generation proceeds in the same topological direction",

(column 4, lines 58-60, 'propagate the current time stamp backward through the whole path (a path is a backward linked list of slots)', and Fig. 3 and Fig. 5 shows the tree having multiple levels (column, which is equivalent to generation), each level having multiple nodes, and each nodes having child nodes except leaf nodes, so that a child generation is processed before its parent node with a backward direction (interpreted as topological direction);).

a mechanism for designating selected ones of said nodes as active nodes, wherein said active nodes have a probability score above a pre-determined search threshold, (column 4, lines 64-67, 'active state (herein equivalent to active node)'; column 3, lines 9-11, 'HMM' with 'states and transitions'; and column 5, lines 64-65, 'the acoustic score and the transition score are accumulated'; which suggests using probability score).

But, Kao does not expressly disclose that during the traversal algorithm "the deepest child generation is processed first", the probability score stated above is "above a pre-determined search threshold" and is "determined from information sourced only from the child generation nodes, wherein said traversal algorithm only traverses said active nodes". However, this feature was well know in the art as evidenced by Mitchell, who discloses a beam search algorithm (herein equivalently interpreted as to traversal algorithm) with a linked list known as the decoding tree (column 3, line 52 to column 4 line 6); the list of "viable" phoneme sequences is updated and stored as a linked list also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (column 4, lines 2-6); at end of the spoken utterance (herein corresponding to the deepest child generation in the process), the best scoring ending phoneme is used to retrieve the most likely phoneme sequence by traversing

through the list of corresponding pointer entries in the decoding tree and this process is commonly referred to as backtracking (column 4, lines 6-11); each node corresponds with a particular active phoneme of the phone network (column 4, lines 2-6) and the beam searching algorithm under the constraints (herein interpreted as a set of rules, including removing those phonemes that likelihood score lower than a prescribed value (a pre-determined search threshold)(column 3, lines 44-65); which suggest that the system is capable of implement the functionality as claimed "said probability score being determined from information sourced only from the child generation nodes, wherein said traversal algorithm only traverses said active nodes". Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao by specifically providing search algorithm for traversing only active nodes (active states) of the tree structure, using probability score only based on the child generation nodes for the active nodes and using a pre-determined threshold for searching, as taught by Mitchell, for the purpose of reducing search complexity (Mitchell: column 3, lines 53-54) for a speech recognition system.

As per **claim 3** (depending claim 1), Kao in view of Mitchell further teaches that said tree data structure is encoded in said memory with parent-child generations being represented through linked list, (Kao: column 2, line 4 and column 4, line 60; and column 4, lines 12-24, 'slot (node)' 'structure', also see Fig. 5).

As per **claim 6** (depending claim 1), Kao in view of Mitchell further disclose a slot (node) structure for the search network (Kao: column 4, lines 7-20 and column 9, lines 10-18), and the list of "viable" phoneme sequences is updated and stored as a linked list (herein interpreted as active envelope data structure) also known as the decoding tree,

in which each node corresponds with a particular active phoneme of the phone network (Mitchell: column 4, lines 2-6), which corresponds to the claimed "said mechanism for designating selected ones of said nodes as active nodes comprises an active envelope data structure associated with said tree data structure."

As per **claim 7** (depending claim 1), Kao in view of Mitchell further discloses a mechanism for designating selected ones of said nodes as active nodes (Kao: column 3, lines 55-59, 'lexicon HMM' and 'active state (herein equivalent to active node)'); and wherein said traversal algorithm includes a traversal rules whereby only said active nodes are traversed, (Mitchell: column 3, lines 52-53, 'a beam search algorithm (herein equivalently interpreted as to traversal algorithm) only searches the active portion of the phone network'; column 4, lines 2-6, 'the list of "viable" phoneme sequences is updated and stored as a linked list also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network').

As per **claim 8** (depending claim 1), Kao in view of Mitchell further discloses said tree data structure is a lexical tree representing a lexicon (column 2, lines 1-26, 'lexical tree', 'pronunciation grammar'; and column 3, lines 55-59 'lexicon HMM').

As per **claim 9** (depending claim 1), Kao in view of Mitchell further discloses said tree data structure is a lexical tree representing the lexicon of a speech recognizer (column 2, lines 1-26, 'lexical tree', 'pronunciation grammar'; and column 3, lines 32-59, 'a speech recognition system (equivalent to speech recognizer)', 'lexicon HMM').

As per **claim 10**, as best understood in view of objection (see above), Kao discloses a method of memory management in speech recognition, for reducing the size of memory required in speech recognition searching (abstract), comprising:

a tree data structure implemented in a computer-readable memory accessible by a processor, said tree data structure having plurality of nodes, including a root node, child generation nodes and parent generation nodes (column 3, lines 2-5 and Fig. 1, 'computer (inherent include processor)/comparator 10b' and 'memory10c'; column 2, line 40 and column 8, line 9, 'search tree', 'node' and 'slot', also see Fig. 5);

a mechanism for designating selected ones of said nodes as active nodes, said mechanism for designating selected ones of said nodes as active nodes defines an active envelope and uses a set of rule to propagate the active envelope, (column 1, line 47 'Viterbi bean search' and column 7, line 40, 'the search beam width'; column 4, lines 10-20 and 55-69, 'active state (herein equivalent to active node)', 'many states can be active and need to be evaluated, they are linked together by next_state (pointer)' herein the linked active states is interpreted as active envelope, 'propagate the current time stamp backward through the whole path'); and

a traversal algorithm implemented by said processor, said algorithm traversing said nodes based on a set of traversal rules (column 6, lines 37-38, 'Digital Signal Processor implementation'; column 5, lines 61-67 and Fig.4, 'traverse down the search space'; column 4, lines 1-67, 'defining the computer data structure and implementing the algorithm', 'search algorithm').

But, Kao does not expressly disclose that during the traversal algorithm, the probability score stated above is "above a pre-determined search threshold" and is "determined from information sourced only from the child generation nodes, wherein said traversal algorithm only traverses said active nodes". However, this feature was well know in the art as evidenced by Mitchell, who discloses a beam search algorithm (herein

equivalently interpreted as to traversal algorithm) with a linked list known as the decoding tree (column 3, line 52 to column 4 line 6); the list of "viable" phoneme sequences is updated and stored as a linked list also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (column 4, lines 2-6); at end of the spoken utterance (herein corresponding to the deepest child generation in the process), the best scoring ending phoneme is used to retrieve the most likely phoneme sequence by traversing through the list of corresponding pointer entries in the decoding tree and this process is commonly referred to as backtracking (column 4, lines 6-11); each node corresponds with a particular active phoneme of the phone network (column 4, lines 2-6) and the beam searching algorithm under the constraints (herein interpreted as a set of rules, including removing those phonemes that likelihood score lower than a prescribed value (a pre-determined search threshold)(column 3, lines 44-65); which suggest that the system is capable of implement the functionality as claimed "said probability score being determined from information sourced only from the child generation nodes, wherein said traversal algorithm only traverses said active nodes". Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao by specifically providing search algorithm for traversing only active nodes (active states) of the tree structure, using probability score only based on the child generation nodes for the active nodes and using a pre-determined threshold for searching, as taught by Mitchell, for the purpose of reducing search complexity (Mitchell: column 3, lines 53-54) for a speech recognition system.

As per **claim 11** (depending claim 10), Kao in view of Mitchell further defines a slot (node) structure for the search network (Kao: column 4, lines 7-20 and column 9,

lines 10-18), and the list of "viable" phoneme sequences is updated and stored as a linked list (herein interpreted as active envelope data structure) also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (Mitchell: column 4, lines 2-6), which corresponds to the claimed "said mechanism for designating selected ones of said nodes as active nodes comprises an active envelope data structure associated with said tree data structure."

As per **claim 12** (depending claim 10), Kao in view of Mitchell further discloses that said traversal algorithm includes a dynamic programming process that assigns a likelihood score to nodes that are traversed (Mitchell: column 3, lines 41-53, 'highest likelihood score' and 'dynamic programming using Viterbi algorithm').

As per **claim 13** (depending claim 12), Kao in view of Mitchell further discloses that said mechanism for designating selected ones of said nodes uses said likelihood score to designate said active nodes (Mitchell: column 2, lines 12-24, 'computing likelihood score for all active sub-word (herein equivalent to active node) models'; column 2, lines 12-24, 'there is change in the local best path which is based on the cumulative likelihood score of the phoneme sequence').

As per **claim 14** (depending claim 10), Kao in view of Mitchell further discloses the beam search algorithm (herein equivalently interpreted as traversal algorithm) for active portion of the phone network, including activating all valid phonemes, dynamic programming by using Viterbi algorithm, pruning unlikely phoneme sequences that have a lower cumulative likelihood score than a prescribed value (predetermined thresholds) (Mitchell: column 3, lines 52-65), which corresponds to the claimed "said traversal algorithm includes a dynamic programming process that assigns a likelihood score to

nodes that are traversed and wherein nodes are designated as active nodes if their likelihood score is above a predetermined threshold."

As per **claim 15** (depending claim 14), Kao in view of Mitchell further teaches a prescribed value relative to the current best cumulative score (herein equivalently interpreted as highest likelihood score) (Mitchell: column 3, lines 62-54), which corresponds to the claimed "said predetermined threshold is calculated based on the highest likelihood score."

As per **claim 16** (depending claim 10), Kao in view of Mitchell discloses a slot (node) structure for the search network (Kao: column 4, lines 7-20 and column 9, lines 10-18) that is capable of evaluating and linking active states (Kao: column 5, lines 1-7); an example of the expansion (herein interpreted as propagate) from phone to next phone (Kao: column 5, lines 11-19 and Fig. 4); and the list of "viable" phoneme sequences is updated and stored as a linked list (herein interpreted as active envelope) also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (Mitchell: column 4, lines 2-6) and the beam searching algorithm under the constraints (herein interpreted as a set of rules, including removing those phonemes that likelihood score lower than a prescribed value (Mitchell: column 3, lines 44-65); which corresponds to the claimed "said a mechanism for designating selected ones of said nodes as active nodes defines an active envelope and uses a set of rules to propagate the active envelope by removing nodes that have a likelihood score below a predetermined threshold."

12. Claims 2, 4 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao in view of Mitchell and further in view of well known prior art (MPEP 2144.03).

As per **claim 2** (depending claim 1), Kao in view of Mitchell fails to expressly disclose that the "said tree data structure is encoded in said memory as a flat representation in which nodes of each generation occupy contiguous memory locations". However, the examiner takes official notice that this feature was well known in the art, because conventional breadth-first traversal algorithm is generally used for storing nodes of each generation in contiguous memory location.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao in view of Mitchell by specifically providing a memory arrangement same as or similar to that of the conventional breadth-first traversal algorithm, for the purpose of increasing processing efficiency.

As per **claim 4** (depending claim 1), Kao in view of Mitchell further discloses a slot (node) using C (language) structure that has fields of indexes and pointers (Kao: column 4, lines 12-24), which are used for linking its parent and/or child, and also inherently used for indicia, such as slot_pointer = null or index_integer = 0 stands for a boundary, which corresponds to the claimed "the nodes … have indicia designating the topological boundary between children of the same parent". But Kao in view of Mitchell fails to expressly disclose that the "said tree data structure is encoded in said memory as a flat representation in which nodes of each generation occupy contiguous memory locations". However, the examiner takes official notice that this feature was well known

in the art, because conventional breadth-first traversal algorithm is generally used for storing nodes of each generation in contiguous memory location.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao in view of Mitchell by specifically providing a memory arrangement same as or similar to that of the conventional breadth-first traversal algorithm, for the purpose of increasing processing efficiency.

As per **claim 17** (depending claim 10), Kao in view of Mitchell further discloses a slot (node) structure for the search network (Kao: column 4, lines 7-20 and column 9, lines 10-18) that is capable of evaluating and linking active states (Kao: column 5, lines 1-7); an example of the expansion (herein interpreted as propagate) from phone to next phone (Kao: column 5, lines 11-19 and Fig. 4); and the list of "viable" phoneme sequences is updated and stored as a linked list (herein interpreted as active envelope) also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (Mitchell: column 4, lines 2-6) and the beam searching algorithm under the constraints (herein interpreted as a set of rules) (Mitchell: column 3, lines 44-65); which corresponds to the claimed "said a mechanism for designating selected ones of said nodes as active nodes defines an active envelope and uses a set of rules to propagate the active envelope". But, Kao in view of Mitchell fails to expressly disclose that the "mechanism uses a set of rules to propagate the active envelope *by inserting nodes* that have a likelihood score above a predetermined threshold". However, the examiner takes official notice that this feature was well known in the art, because inserting nodes on a linked list based structure is widely used in data structure design in computer applications, thus Kao in view of Mitchell is capable of inserting node in a link

list (Kao: column 6, lines 1-2, 'add at least one slot (node) to the search path, and Mitchell: column 3, lines 44-65, 'phoneme ... are removed'), without any difficulty.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao in view of Mitchell by specifically providing a mechanism for inserting nodes in an active node link list, for the purpose of implementing an alternative way for a link list in a search algorithm.

As per **claim 18** (depending claim 14), Kao and Mitchell and well-known prior art further discloses dynamic memory for building a searching tree by using RAM (Kao: column 1, lines 23-25); a slot (node) structure for the search network with fields of indexes and pointers (herein interpreted topological index, and inherently can be used for sorting), and execution requirements including grammar, timing and condition (herein interpreted as a set of rules) (Kao: column 4, lines 7-67 and column 9, lines 10-45), which suggests that the combined system is capable of implementing the functionality as claimed "said set of rules for inserting nodes guarantees that the nodes in said active envelope are sorted by their topological index."

As per **claim 19** (depending claim 10), Kao in view of Mitchell dose not expressly disclose that the "said processor employs a cache and wherein said tree data structure is encoded in said memory such that traversal of said tree proceeds into said cache". However, the examiner takes official notice that this feature was well known in the art, since caching technique for both hardware structure and software arrangement was widely used in signal processing art and computer related art. Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao in view of Mitchell by specifically providing caching technique in computer

applications for traversal using tree data structure, for the purpose of reducing processing time.

As per **claim 20** (depending claim 14), the rejection is based on the same reason described for claim 19 because claim 20 recites same or similar limitation(s) as claim 19.

Conclusion

13. Any response to this action should be mailed to:

Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306, (for formal communications intended for entry)

Or:

(703) 872-9306, (for informal or draft communications, and please label "PROPOSED" or "DRAFT")

Patent Correspondence delivered by hand or delivery services, other than the USPS, should be addressed as follows and brought to U.S. Patent and Trademark Office, 220 20th Street S., Customer Window, Crystal Plaza·Two, Lobby, Room 1B03, Arlington, VA, 22202

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (703) 305-5631. The examiner can normally be reached on Monday through Thursday from 9:00 a.m. to 7:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-6954.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see http://pair-direct.uspto.gov.

QH/qh
August 13, 2004

Donald L. Storm
PATENT EXAMINER
AU 2654